

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 24

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte I-HWA LEE and BARRY A. MORRIS

Appeal No. 2000-1031
Application No. 08/591,330

ON BRIEF

Before WINTERS, GARRIS, and DELMENDO, Administrative Patent Judges.

DELMENDO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1, 2, and 4 through 9, which are all of the claims pending in the above-identified application.

The subject matter on appeal relates to an adhesive composition comprising: a) a specified non-metallocene generated polyethylene; b) a particular amount of a specified acid-grafted

metallocene polyethylene; and c) optionally a particular amount of a hydrocarbon elastomer. The specification states (page 4, lines 18-20):

The invention depends on the discovery that even a small amount, - as little as 5 percent, and generally no more than 35 percent - of acid-grafted metallocene polyethylenes, when used in otherwise conventional-linear polyethylene and/or LDPE based adhesive compositions, can produce markedly superior adhesives compared with similar adhesive compositions but which contain comparable levels of acid-grafted conventional-linear polyethylene and/or acid grafted LDPE.

Further details of this appealed subject matter are recited below in illustrative claim 1, which is the sole independent claim on appeal and which is reproduced from the amendment filed Dec. 8, 1997 (paper 8):

1. An adhesive composition, comprising:
 - a) a non-metallocene generated polyethylene selected from the group consisting of conventional-HDPE, conventional-LLDPE, conventional-VLDPE, LDPE, and a blend of any of these four,
 - b) from 5 to 35 weight percent, based on the total weight of a) plus b) plus c), of an acid-grafted metallocene polyethylene of those having a melt flow ratio I_{10}/I_2 of less than 6.53 and an M_w/M_n ratio of greater than the melt flow ratio less 4.63, and
 - c) optionally up to 30 weight percent of a hydrocarbon elastomer, the acid grafted agent being an unsaturated carboxylic acid or its derivative, selected from the group consisting of acrylic acid, methacrylic acid, fumaric acid, maleic acid, nadic acid, citraconic acid,

itaconic acid and anhydrides, metal salts, esters, amides, or imides of the above acids and the level of grafting being such that the total amount of grafting agent in the total composition a) plus b) plus c) is from 0.01 to 3 weight percent.^[1]

The examiner relies on the following prior art reference as evidence of unpatentability:

Hughes et al. (Hughes)	5,346,963	Sep. 13, 1994
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Claims 1, 2, and 4 through 9 on appeal stand rejected under 35 U.S.C. § 102(b) as anticipated by Hughes. (Examiner's answer of Dec. 23, 1999, paper 23, pages 3-5.) Also, appealed claims 1, 2, and 4 through 9 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Hughes. (Id.)

We reverse these rejections.

The initial burden of establishing a prima facie case of unpatentability rests on the examiner. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992) ("[T]he examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a prima facie case of unpatentability.") In this case, it is our judgment that the examiner has not met this initial burden of proof.

¹ Claim 1 as it appears in the appendix to the appeal brief filed Nov. 1, 1999 (paper 21) differs significantly from claim 1 of record in the application.

Rejection under 35 U.S.C. § 102(b)

"To anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently." In re Schreiber, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997); accord Glaxo Inc. v. Novopharm Ltd., 52 F.3d 1043, 1047, 34 USPQ2d 1565, 1567 (Fed. Cir. 1995).

In this case, we find that Hughes does not disclose every limitation of appealed claim 1. Specifically, Hughes describes a blend composition comprising a polyolefin polymer (e.g., a conventional polyolefin such as LLDPE or HDPE) and between about 2 and about 70 wt.% (preferably between about 5 and about 30 wt.%) of a graft-modified substantially linear ethylene polymer. (Column 5, lines 55-63.) According to Hughes, the graft-modified substantially linear ethylene polymer provides improved adhesive properties without adversely impacting the rheological properties of the polymer. (Column 1, lines 55-62.) Hughes teaches that the graft-modified substantially linear ethylene polymer is obtained by grafting at least about 0.01 wt.% to typically about 10 wt.%, based on the combined weight of the ungrafted polymer and the grafting agent, (preferably at least about 0.05 wt.% to preferably about 5 wt.%) of an unsaturated organic compound (preferably maleic anhydride) on a

substantially linear ethylene polymer prepared by "constrained geometry catalysis."² (Abstract; column 3, lines 41-66.)

As to the melt flow ratio (I_{10}/I_2) and the molecular weight distribution (M_w/M_n) of the substantially linear ethylene polymer, Hughes teaches that the melt flow ratio (I_{10}/I_2) is equal to or greater than 5.63, preferably from about 6.5 to 15, and that the molecular weight distribution (M_w/M_n) is less than or equal to I_{10}/I_2 minus 4.63, preferably between about 1.5 and 2.5. (Column line 65 to column 3, line 5.) Also, Hughes teaches as follows:

The unique characteristic of the homogeneously branched, substantially linear ethylene polymers is a highly unexpected flow property where the I_{10}/I_2 value of the polymer is essentially independent of the polydispersity index (i.e., M_w/M_n) of the polymer. This is contrasted with conventional linear homogeneously branched and linear heterogeneously branched polyethylene resins having rheological properties such that to increase the I_{10}/I_2 value the polydispersity index must also be increased.

² The examiner asserts (answer, p. 3) that "constrained geometry catalysts" are also known as "metallocene catalysts." In this regard, Hughes refers to U.S. Patent 5,272,236 to Lai et al. (Lai '236) issued on Dec. 21, 1993 and U.S. Patent 5,278,272 to Lai et al. (Lai '272) issued on Jan. 11, 1994 for the method of preparing the substantially linear ethylene polymers. (Col. 2, ll. 8-12.) Both of these patents, which are incorporated into the disclosure of Hughes, describe the use of metallocene catalysts.

The examiner's basic position (answer, pages 5-6) is:

As disclosed by Hughes, "the I_{10}/I_2 value of the polymer is essentially independent of the polydispersity index (i.e., M_w/M_n) of the polymer" (col. 3, lines 10-13). As such, the polydispersity index M_w/M_n of the polymer can be any value within the limits of the equation $M_w/M_n \leq (I_{10}/I_2 - 4.63)$ since the I_{10}/I_2 value and M_w/M_n of the polymer are "essentially independent." The values for M_w/M_n and I_{10}/I_2 therefore do not "operate simultaneously" in the sense that they should be interpreted as being fixed by a particular corresponding value of I_{10}/I_2 or M_w/M_n . Instead, the parameter equations disclosed by Hughes et al. must be interpreted as being ranges for each of the I_{10}/I_2 and M_w/M_n values. Hughes et al.'s equations therefore mean that $I_{10}/I_2 \geq 5.63$ and, since $M_w/M_n \leq (I_{10}/I_2 - 4.63)$, M_w/M_n may vary from unity (i.e., if $I_{10}/I_2 = 5.63$) to a large number (i.e., if I_{10}/I_2 is a large number then M_w/M_n is also a large number). Hughes et al.'s disclosure of values within the claimed ranges therefore anticipates these ranges.

We cannot agree with the examiner's interpretation of the prior art teachings. Although Hughes states that I_{10}/I_2 and M_w/M_n of the polymer are "essentially independent," the reference unequivocally teaches that the substantially linear ethylene polymer described in Hughes must satisfy the following expressions:

$$I_{10}/I_2 \geq 5.63$$

$$M_w/M_n \leq (I_{10}/I_2) - 4.63$$

By contrast, appealed claim 1 requires the metallocene polyethylene to satisfy the following relationships:

$$I_{10}/I_2 < 6.53$$

$$M_w/M_n > (I_{10}/I_2) - 4.63$$

While the examiner is correct in finding (answer, page 4) that there is a substantial overlap between " $I_{10}/I_2 \geq 5.63$ " (Hughes) and " $I_{10}/I_2 < 6.53$ " (appealed claim 1), there is no overlap between " $M_w/M_n \leq (I_{10}/I_2) - 4.63$ " (Hughes) and " $M_w/M_n > (I_{10}/I_2) - 4.63$ " (appealed claim 1). That is, while the M_w/M_n value of the polymer in Hughes is less than or equal to " $(I_{10}/I_2) - 4.63$," the M_w/M_n value of the polymer recited in appealed claim 1 is greater than " $(I_{10}/I_2) - 4.63$." As explained in the present specification (page 7, lines 15-29; page 8, lines 3-5; page 9; lines 21-28), the metallocene catalyzed polymer disclosed in Hughes and the metallocene polyethylene recited in appealed claim 1 are mutually exclusive.³

The examiner argues that an M_w/M_n value of 1.5, which is described as a preferred endpoint in Hughes, anticipates the claimed range. This argument is misplaced. While appealed claim 1 may encompass an M_w/M_n value of 1.5, this fact alone is not dispositive. As we noted above, appealed claim 1 requires two parameters to be satisfied. To illustrate, a polymer having an I_{10}/I_2 of 6.15, for example, and a M_w/M_n of 1.5 satisfies the

³ In this regard, we find it significant that the appellants attempted to distinguish over Hughes by amending claim 1 to avoid the rejections based on the teachings of Hughes. (Amendment filed Dec. 8, 1997, paper 8.)

two parameters described in Hughes (i.e., " $I_{10}/I_2 \geq 5.63$ " and " $M_w/M_n \leq (I_{10}/I_2) - 4.63$ "). However, it does not satisfy the two parameters recited in appealed claim 1 (i.e., " $I_{10}/I_2 < 6.53$ " and " $M_w/M_n > (I_{10}/I_2) - 4.63$ "), because M_w/M_n can never be greater than " $(I_{10}/I_2) - 4.63$." For the examiner's theory to hold up, a given polymer must have a variable M_w/M_n or a variable I_{10}/I_2 . This, of course, is not possible given the state of the art.

Because the examiner's rejection under 35 U.S.C. § 102(b) is founded on an erroneous interpretation of the prior art, we reverse the stated rejection.

Rejection under 35 U.S.C. § 103(a)

With respect to the 35 U.S.C. § 103(a) rejection, the examiner's position is:

In view of Hughes et al., it would have been prima facie obvious to one of ordinary skill in the art to blend a carboxylic acid or anhydride graft-modified metallocene polyethylene having I_{10}/I_2 and M_w/M_n values within the scope of the claims with a "conventional" polyethylene according to the claims, to use such a blend as an adhesive, and to form multilayer articles comprising the adhesive composition, since Hughes et al. clearly discloses and suggests such blends and applications.

Again, we cannot agree with the examiner's analysis. As we discussed above, the substantially linear ethylene polymer of Hughes and the metallocene polyethylene of appealed claim 1 are

mutually exclusive. The examiner has not pointed to any evidence, or provided any acceptable reasoning, establishing that one of ordinary skill in the art would have been led to modify the composition of Hughes so as to arrive at a composition encompassed by appealed claim 1.

On this record, we are constrained to reverse the examiner's rejection under 35 U.S.C. § 103 as well.

Other Issues

As we discussed above, the substantially linear ethylene polymer described in Hughes and the metallocene polyethylene recited in appealed claim 1 are mutually exclusive. This difference notwithstanding, we observe that the blend composition described in Hughes is substantially identical to the appellants' claimed composition. For example, Hughes describes a preferred ethylene polymer having a M_w/M_n value of 1.5. (Column 3, line 5.) Using the mathematical relationship at column 3, line 3, one of ordinary skill in the art would have determined that the I_{10}/I_2 value may be 6.13. On the other hand, the metallocene polyethylene recited in appealed claim 1 would have an M_w/M_n value of greater than 1.5 (e.g., 1.5001) when I_{10}/I_2 is 6.13. Thus, a preferred composition of Hughes differs from a composition encompassed by appealed claim 1 only in that the M_w/M_n is 1.5 instead of 1.5001.

In Titanium Metals Corp. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985), a claim recited a titanium base alloy consisting essentially of 0.8% nickel, 0.3% molybdenum, up to 0.1% maximum iron, and the balance titanium. A prior art reference described two similar alloys: (i) one with 0.25% molybdenum and 0.75% nickel; and (ii) another with 0.31% molybdenum and 0.94% nickel. The court held (id.):

As admitted by appellee's affidavit evidence from James A. Hall, the Russian article discloses two alloys having compositions very close to that of claim 3, which is 0.3% Mo and 0.8% Ni, balance titanium. The two alloys in the prior art have 0.25% Mo-0.75% Ni and 0.31% Mo-0.94% Ni, respectively. The proportions are so close that prima facie one skilled in the art would have expected them to have the same properties. Appellee produced no evidence to rebut that prima facie case. The specific alloy of claim 3 must therefore be considered to have been obvious from known alloys.

Upon return of this application to the jurisdiction of the examiner, the appellants and the examiner should consider whether the court's holding in Titanium Metals is controlling on the facts of the present case. Specifically, the appellants and the examiner should determine whether the close structural relationship between the preferred composition of Hughes and a composition encompassed by appealed claim 1 gives rise to a prima facie case of obviousness within the meaning of 35 U.S.C.

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§ 103(a). In this regard, the appellants and the examiner should fully explore whether the closeness of the M_w/M_n values, which indicate the respective molecular weight distributions of the polymers, is sufficiently analogous to the closeness of relative proportions of metals in an alloy as in Titanium Metals.

Summary

In summary, we reverse the examiner's rejection under 35 U.S.C. § 102(b) of appealed claims 1, 2, and 4 through 9 as anticipated by Hughes. We also reverse the examiner's rejection under 35 U.S.C. § 103(a) of appealed claims 1, 2, and 4 through 9 as unpatentable over Hughes.

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The decision of the examiner is reversed.

REVERSED

Sherman D. Winters)	
Administrative Patent Judge)	
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Bradley R. Garris)	
Administrative Patent Judge)	APPEALS AND
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